

**Fig. 10-1-a** This glass plate negative dates from the 1920s. The silver image is in excellent condition, albeit very dense, but the plate has been broken right down the middle!



### Example 1: Repairing an Old Glass Plate

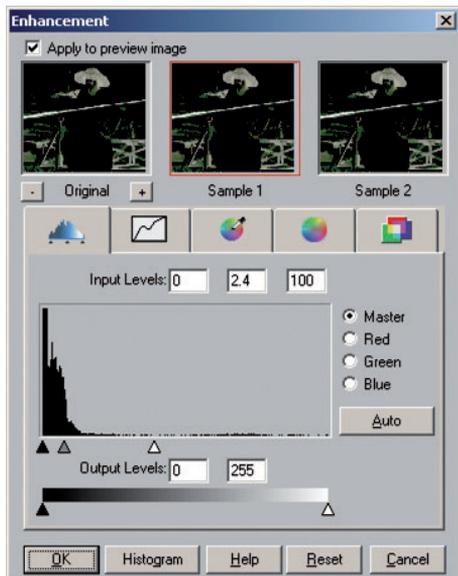
The 4-inch by 6-inch glass plate negative shown in Figure 10-1-a was made in the 1920s in Venice or Lido, Italy. It's tarnished, but otherwise the silver image is in great shape. While the negative is very dense, typical for photographs of the time, the edges of the plate are clear and only slightly yellowed. The only thing that prevents me from printing this plate conventionally on a Grade 0 paper is that it's broken in two!

After masking off the area surrounding the image on the plate (to reduce flare, see Chapter 4, Getting the Photo into the Computer, page 113), I scanned the plate at 1200 ppi in 16-bit RGB mode. As the scanner software histogram shows (Figure 10-1-b), almost all the tonal information is concentrated in the lower 20% of the scale. The scattering of values higher than that corresponds to light leaking through the cracks and some small missing patches of emulsion.

After a couple of trial scans, I settled on a white level of 100 and a midpoint (gamma) adjustment of 2.4. That's an extreme gamma, but experiments showed that it produced a good-looking negative on the screen. I wasn't too worried about the precise curve shape because I was working in 16-bit mode. Glass plates should be scanned with the emulsion side of the plate in contact with the platen because that's where the scanner's plane of focus is. That means a scan will come out left-right reversed, so after I completed the scan I flipped the image horizontally.

Figure 10-1-c shows the resulting scan; it's much clearer than Figure 10-1-a, which shows an unadjusted scan. The histogram in Figure 10-1-d shows that I have an acceptable range of information, with no clipping of the shadow or highlight detail in the photograph. The RGB scan is nearly 200 MB, and there's no useful color information in the photo, so I used Channel Mixer to convert the scan to grayscale to speed up further work. I used the Channel Mixer

Example 1: Repairing an Old Glass Plate



**Fig. 10-1-b** The scanner software histogram shows that this is a very dense negative. I moved the white slider all the way down to a value of 100 and the midtone slider to a setting of 2.4 to expand the tones in the dense parts of the negative as much as possible.



**Fig. 10-1-c** Scanning the glass plate with the settings shown in Figure 10-1-b produces a much-improved image. Now detail is clearly visible throughout the tonal range of the negative.

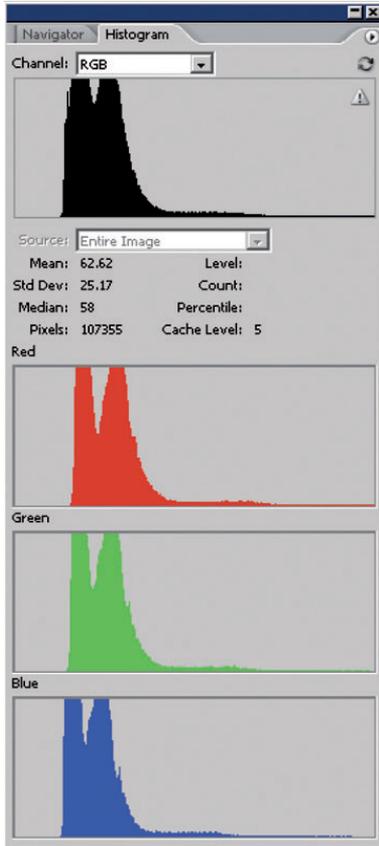


Fig. 10-1-d The histogram of the scan in Figure 10-1-c shows a considerably improved tonal range over the original. Although the range is still restricted to about one-third of the available values, there's enough data in a 16-bit scan for me to create a good finished print.

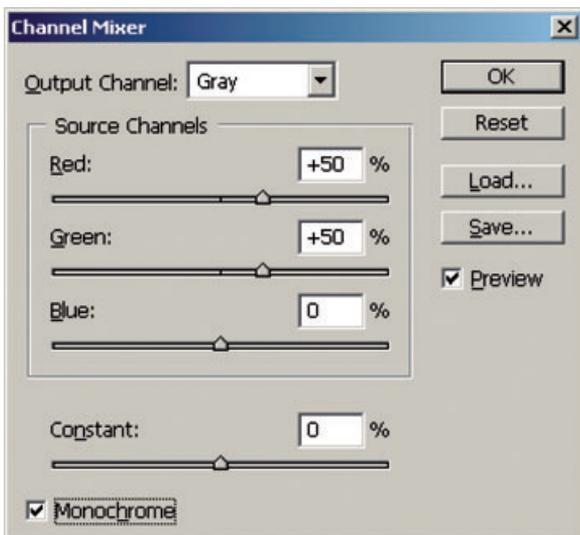
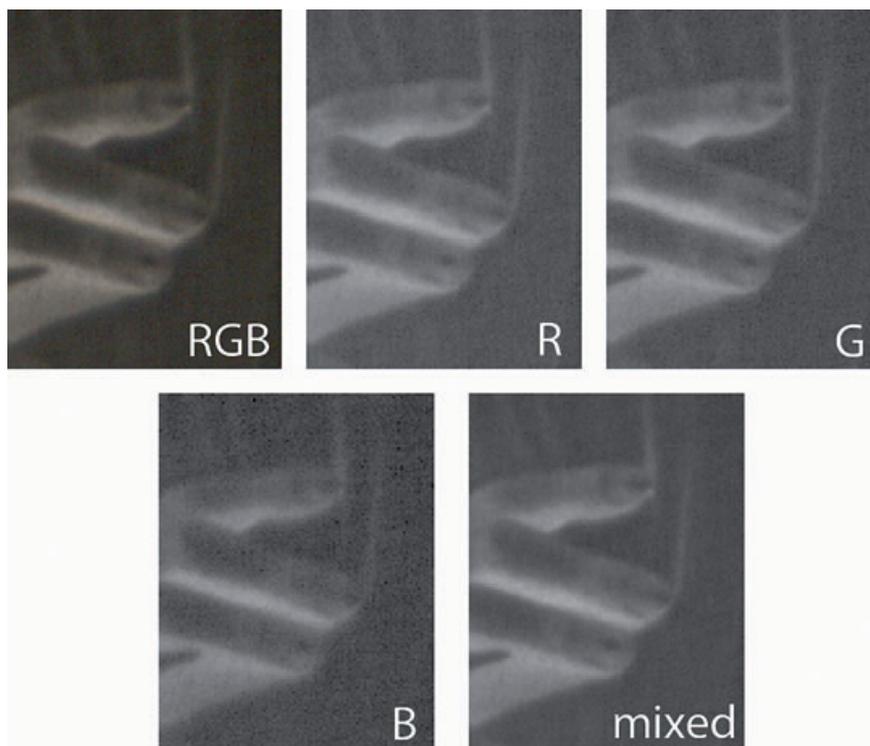


Fig. 10-1-e These are the Channel Mixer settings that convert Figure 10-1-c from RGB color to grayscale. I'm using a mix of 50% red and 50% green because these two channels have substantially less noise than the blue channel (see Figure 10-1-f), and the combination of the two produces better tonality than either of them alone.

Fig. 10-1-f This enlargement of Figure 10-1-c shows how highlight detail is improved and noise reduced by using the Channel Mixer. The blue (B) channel has much worse noise than the red (R) and green (G) channels, so it gets discarded. Channel Mixer (see Figure 10-1-e) combines 50% red and 50% green channels to produce the mixed channel, lower right. This new grayscale image has better tonality and less noise than any of the individual RGB channels



settings in Figure 10-1-e to mix equal parts of just the red and the green channels. Then I converted the RGB monochrome image to a grayscale one.

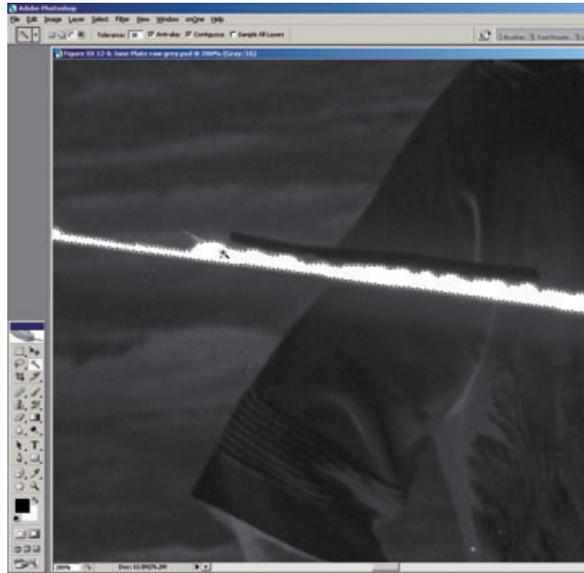
As you can see in the enlargement of the white dress and fingers in Figure 10-1-f, the blue channel is much noisier in this scan than the red and green channels, so eliminating it got me a monochrome image with better tonality and less noise than any of the individual channels. This is also a cleaner result than I would get by simply desaturating the scan or directly converting the mode to grayscale.

The two pieces of the plate were out of alignment by a few hundredths of an inch, so I created a selection around the top piece and nudged it into alignment with the bottom piece. I started by selecting the crack between the pieces. The pure white gap was easy to select using the Magic Wand tool (Figure 10-1-g). I used a broad tolerance setting of 20 with “Contiguous” checked, so that I didn’t accidentally pick up any stray clear spots in the plate while grabbing as much of the crack as possible. A few clicks of the Magic Wand along the length of the crack selected it all.

I expanded that selection by 2 pixels to ensure that I had included all the glow at the edges of the crack and inverted the selection. That left me with the two pieces of the plate separately selected. Using the Lasso in subtractive mode, I circled the lower selection and eliminated it.

With the upper piece alone selected, I held down the control key, which turns the cursor into a nudging tool. I used to the arrow keys to nudge the upper piece a dozen pixels to the right and a couple of pixels down. Figure 10-1-h, right, shows the improvement in alignment.

**Fig. 10-1-g** Selecting the crack between the plates is easy because it's pure white. I used the Magic Wand tool with a Tolerance of 20 in Contiguous mode. The selection is indicated by the dashed line in the screenshot. I expanded the selection by a couple of pixels to include the edges of the crack and inverted it to select the pieces of the glass plate and exclude the crack.



**Fig. 10-1-h** The figure on the left is the original scan. The two pieces of the plate are misaligned by a few hundredths of an inch. Applying the selection that I made in Figure 10-1-g to one of the pieces of the plate, I nudged the top half of the plate over until it was correctly aligned with the bottom half (right).

Because it's easier to see white spots against a dark background than vice versa, I decided to clean up the dust and scratches while the photograph was still in negative form. I used the Dust & Scratches History Brush trick from Chapter 8, Damage Control, page 268, with a 10-pixel filter radius and a threshold of 5.

Almost all of the garbage I had to clean up was lighter than the photograph, so I set the brush to Darken mode, which minimized its impact on fine detail and image grain. After working my way through the photograph and getting rid of all the light specks, I switched the brush to Lighten mode and picked off the few dark spots and scratches.

Next I inverted the image to produce a positive and cropped and rotated it to make the horizon line horizontal. That yielded Figure 10-1-i. I added a Curves adjustment layer with the settings shown in Figure 10-1-j. This approximated what a good print would ultimately look like, but it showed that there was considerable light falloff toward the edges of the plate (Figure 10-1-k). To even out the plate exposure I created a mask (Figure 10-1-l) for the Curves adjustment layer with the circular Gradient tool.

I set the foreground color to white and the background color to a gray with a luminance of 65 and drew a gradient line from the center of the image to the corner. This mask weakened the effect of the Curves adjustment layer toward the edges of the image, so that it darkened the edges less. The result, seen in Figure 10-1-m, is much more even. I can deal with the small amount of residual darkening in the corners by dodging the photograph later.

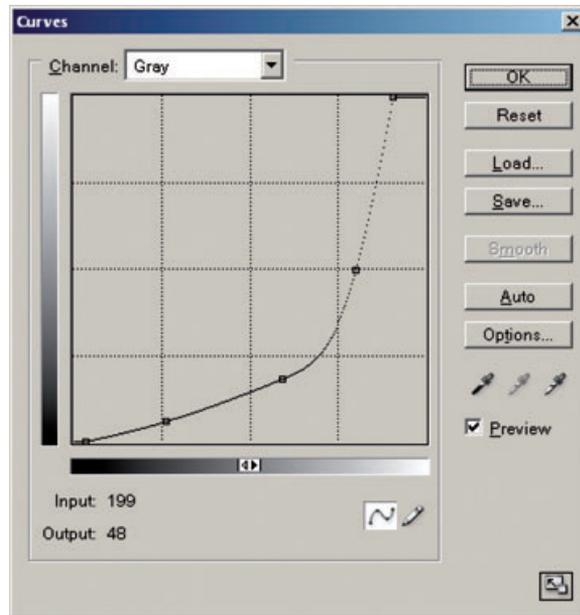
The increased contrast in the adjusted photograph revealed a new problem. The very bright light that shone through the crack during scan had caused flare that created a dark halo around the crack in the positive image. This made the job of erasing the crack considerably more complex, so I tackled it in stages with several different tools.

The easiest step was removing the crack from the sky, where the crack was a thin line with very little halo. Since there was no sky detail other than grain, I just cloned the nearby sky into the crack to make it go away. Next in difficulty was the ocean. There the crack was heavier and there was some evidence of a halo. There was also the blurry detail in the water to worry about. I decided first to reduce the strength of the crack.

**Fig. 10-1-i** Now that the scan has been aligned and cleaned, I've inverted it to produce a positive image. The photograph is very pale and flat; the Curves adjustment in Figure 10-1-j will fix that.



**Fig. 10-1-j** This Curves adjustment produces Figure 10-1-k. I moved the white point in to restore the highlights to near-white. This curve greatly increases contrast in the midtones and highlights in exchange for sacrificing it in the shadows. The midtones are what give the photograph brilliance and life, so good contrast there is more important than maintaining shadow contrast.



## Example 1: Repairing an Old Glass Plate



**Fig. 10-1-k** I applied the curve from Figure 10-1-j to Figure 10-1-i in a Curves adjustment layer. That produces very good tonal quality. Increasing the highlight contrast this much makes light falloff at the corners of the photograph very noticeable. I fixed that with an adjustment layer mask in Figures 10-1-l and 10-1-m.



**Fig. 10-1-l** I created this mask for the Curves adjustment layer in Figure 10-1-k using the circular Gradient tool. It fades the effect of the curve from Figure 10-1-j so that it doesn't darken the photograph as much in the corners.

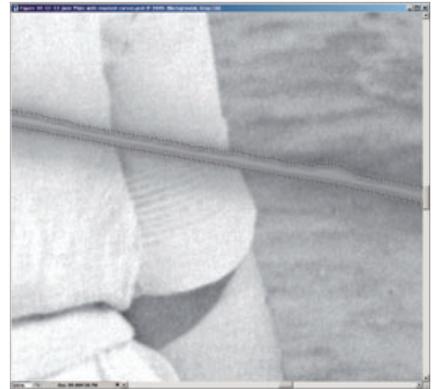


**Fig. 10-1-m** The masked Curves adjustment layer does a nice job of restoring proper tonality to this photograph at the same time that it evens out the lighting. The residual darkening in the corners can be cleaned up with a little bit of dodging

**Fig. 10-1-n** The first stage in repairing the crack in the plate is to select it using the Magic Wand tool. The selected area is outlined by the dotted line in this screenshot.



**Fig. 10-1-o** I applied the Median filter with a very large radius of 85 pixels to the selected crack. That filled in the selection with the average of the surrounding pixels. This makes it easier for other tools like the Spot Healing Brush to replace the selection with surrounding detail and blend it in.



I selected the blackest parts of the crack with the Magic Wand, expanded the selection by 3 pixels, and feathered it by 2 pixels (Figure 10-1-n). I applied the Median filter with a radius of 85 pixels; that filled in the crack with the average brightness of the surrounding pixels (Figure 10-1-o). This made it easier to manipulate the crack in later steps.

Once I had minimized the intensity of the crack, the Spot Healing Brush in Photoshop CS2 was up to the task of erasing it from the water. I set the brush to a radius about 20% bigger than the halo with a hardness of 0. Brushing the tool along the cracks in short segments, it didn't take long to erase it.

Occasionally the Spot Healing Brush produced patterns and textures that didn't merge well with the surrounding waves. Usually I could make those go away with a second pass from the brush at a different angle. If the blend still wasn't perfect, I used the cloning tool at 30% strength to blend in the boundary between the healed area and the surrounding image.

Now I was ready to tackle the residual halo where the crack had been in the ocean and the halo around the crack in the dress (Figure 10-1-p). Dealing with that required nothing fancier than the Dodge tool. I set the tool diameter to about the width of the halo, the hardness to 50%, and the strength to 7%. I ran this tool back and forth along the halo until it was mostly gone, being careful not to overdo it. Then I dropped the radius down to about a fifth of the width of the halo and carefully brushed out the residual bits, including the strong dark edge right next to the crack across the dress (Figure 10-1-q).

This left a simple, narrow blank area running across the dress that I could easily fill in with the Clone tool. I made a few more light passes with the Dodge tool to remove the last traces of shadows from the repaired area, which gave me the seamless image in Figure 10-1-r.

**Fig. 10-1-p** The Spot Healing Brush has replaced the selected crack with wave details from other parts of the ocean. All that remains of the crack over the water area is a dark smudge.



**Fig. 10-1-q** Dodging the dark smudge in the previous photograph completes the task of erasing the crack from the water. The Dodge tool was also effective at removing the dark halo that borders the crack over the woman's dress.



**Fig. 10-1-r** Now that I reduced the crack to a thin white line in Figure 10-1-q, it's a simple matter to erase it entirely from the blouse using the Clone tool.



Now I turned my attention to making the photograph look as good as possible. I used a Dodge tool of large radius to reduce the light falloff at the edges and corners of the photograph. I didn't eliminate it entirely, because a small amount of vignetting focused attention on the central subject of the photograph. I just reduced the darkening enough so that it wasn't an obvious artifact and distraction.

There was some residual garbage in the sky—light scratches, small defects in the emulsion, that sort of thing. I used the Magic Wand to select only the sky and shrank the selection by 6 pixels to ensure that I had not captured any of the foreground. Then I applied the Dust & Scratches filter with a radius of 20 and threshold of 2. Since the sky held



**Fig. 10-1-s** This photograph is fully repaired. The crack is gone, and the dust, dirt, and scratches are all cleaned up. The tonal rendition is good, and I've done some dodging and burning-in to even out the lighting a little more. Just a few more finishing touches will make it perfect.

no fine detail, the large radius didn't destroy anything except defects, and the threshold of 2 preserved enough of the grain so that there was no visible difference in texture between the filtered and unfiltered parts of the photograph.

Figure 10-1-s shows a fully repaired photograph. I saved this version as a good record of the original photograph; now I wanted to take it to the next level and come up with a good "print" of it, just as I would in the darkroom.

I used the Burn tool set to 6% and a very large radius to lightly burn in the top half of the sky and the foreground sand. That further focused the viewer's attention on the subject of the photograph. The change was very subtle, almost subliminal, but it made a big difference in the aesthetics.

Next I switched to the Dodge tool and with a brush of small radius lightened the woman's face where it was shadowed by her hat. I paid special attention to her eyes, giving them a little more dodging to bring them out and lightly dodged her hair to better separate its tones from her hat. I also lightened the shadow under her nose that fell across her upper lip and her teeth. Lastly, I dodged the right side of her face and her neck to open up the tones there.

My goal in all of this was to produce a more pleasing but still accurate rendition. I didn't cosmetically alter her appearance or eliminate the look of someone posing in the bright sun, rather I produced a rendering that was more attractive because it was more like what we would see. Figure 10-1-t shows a close-up of her face before and after these simple but important local corrections. These final adjustments produced Figure 10-1-u, a lovely and flawless photograph from a "lost" glass plate.



**Fig. 10-1-t** On the left is an enlargement of Figure 10-1-s. The direct sunlight produced a harsh photograph and buried much of the woman's face in shadow. Judicious use of the Dodge tool opens up the shadows and evens out the lighting on her face just enough to make it look more natural to our eyes. Little touches like this make the difference between a good and a great restoration.

**Fig. 10-1-u** The final print! Some minor adjustments to the Curves layer perk up the whites in the woman's dress and make her stand out more clearly from the background. Burning-in the sand at the bottom and dodging her face add to her sense of presence. This file makes a wonderful-looking print.

